FY 2003 ESTIMATES

RESEARCH AND PROGRAM MANAGEMENT

DESCRIPTION/JUSTIFICATION

The civil service workforce is the underpinning for the successful accomplishment of the Nation's civil aeronautics and space programs. These are the people who plan the programs; conduct and oversee the research; select and monitor the contractors; manage the various research, development, and test activities; and oversee all of NASA's operations. A key dimension of the reinvention of NASA has been the restructuring of the civil service workforce to deliver a space and aeronautics program that is balanced, relevant, and at the forefront of technology development.

Primary goals:

- Acquire and maintain a civil service workforce reflecting the cultural diversity of the Nation,
- Provide a workforce sized and skilled consistent with accomplishing NASA's research, development, and operational missions with innovation, excellence, and efficiency.

The Research and Program Management (R&PM) program provides the salaries, other personnel and related costs, travel and the necessary support for all of NASA's administrative functions and other basic services in support of research and development activities at NASA installations.

- The salaries, benefits, and supporting costs of this workforce comprise approximately 78% of the requested funding.
- Administrative and other support is 20% of the requests.
- The remaining 2% of the request is required to fund travel necessary to manage NASA and its programs.

FTE levels that were included in Program Operations (which were mostly Center Management and Operations) in prior R&PM FTE allocations, are now included in Institutional Support in the Enterprise summaries for each Center.

The FY 2003 budget estimate of $2,639.4 million for Research and Program Management represents an increase of $55.5 million from the FY 2002 budget plan of $2,583.9 million. Of this total increase, Personnel and related costs increase by $119.3 million from FY 2002 to FY 2003. These increases fully fund the civil service workforce, the full year cost of the 2002 payraise, the payraise projected to be effective in January 2003, increased costs of health care and normal salary growth. Travel represents an increase of $4.5 million over the FY 2002 budget plan. $2.5 million of this increase is due to increased travel requirements in the Strategic Launch Initiative. Research Operations Support decreases by $68.3 million from the FY 2002 budget plan. This is due to the FY 02 budget being supplemented by $108.5 million due to the provision of the emergency response fund provided to enhance NASA's security and counter intelligence efforts. In summary, the FY 2003 budget requirement of $2,639.4 million will provide for 18,837

full-time equivalent civil service workyears including 18,264 full-time permanent civil service workyears to support the activities at nine NASA Installations and Headquarters. NASA plans to control personnel levels through full time permanent (FTP) civil servant workyears while continuing to track full-time equivalent workyears, as done in the past. This will allow NASA more flexibility in the use of non-permanent positions for short-term technical needs as well as co-op and intern programs.

The following describes, in detail, the cost elements within this program.

I. Personnel and Related Costs

A. Compensation and Benefits

1. Compensation

a. Permanent Positions: covers the salaries of the full-time permanent civil service workforce and is the largest portion of this functional category.

b. Other Than Full-Time Permanent Positions: includes the salaries of NASA's non-permanent workforce. Programs such as Presidential Management Interns, students participating in cooperative training, summer employment, youth opportunity, and temporary clerical support are covered in this category.

c. Reimbursable Detailees: In accordance with existing agreements, NASA reimburses the parent Federal organization for the salaries and related costs of persons detailed to NASA.

d. Overtime and Other Compensation: Overtime, holiday, post and night differential, and hazardous duty pay are included in this category. Also included are incentive awards for outstanding achievement and superior performance.

2. Benefits: In addition to compensation, NASA, as authorized and required by law, makes the employer's contribution to personnel benefits. These benefits include contributions to the Civil Service Retirement Fund, the Federal Employees Retirement System, employees' life and health insurance, payments to the Medicare fund for permanent employees, and social security contributions. Payments to the civil service retirement fund for re-employed annuitants and severance pay to former employees involuntarily separated through no fault of their own are also included.

B. Supporting Costs

1. Transfer of Personnel: Provides relocation costs required by law, such as the expenses of selling and buying a home, subsistence expenses, and the movement and storage of household goods.

2. Investigative/Other Services: The Office of Personnel Management is reimbursed for activities such as security investigations of new hires and revalidation of sensitive position clearances. In addition, this category pays for, recruitment advertising, and materials, personnel/workforce studies and Federal wage system surveys.

3. Personnel Training: Provided within the framework of the Government Employees Training Act of 1958. Part of the training costs is for courses offered by other Government agencies, and the remainder is for training through non-government sources.

II. Travel

A. Program Travel: The largest part of travel is for direction, coordination, and management of program activities including international programs and activities. The complexity of the programs and the geographical distribution of NASA Installations and contractors necessitate this category of travel. As projects reach the flight stage, support is required for pre launch activities including overseas travel to launch and tracking sites. The amount of travel required for flight projects is significant as it is directly related to the number of systems and subsystems, the number of design reviews, and the number and complexity of the launches and associated ground operations.

B. Scientific and Technical Development Travel: Permits employees engaged in research and development to participate in both Government sponsored and non-government sponsored activities. This participation allows personnel to benefit from exposure to technological advances, which arise outside NASA, as well as allowing personnel to present both accomplishments and problems to their associates and provides for the dissemination of technical results to the United States community.

C. Management and Operations Travel: Provides for the direction and coordination of general management matters and travel by officials to review the status of programs. It also includes travel by functional managers in such areas as personnel, financial management, and procurement. This category also includes the cost of travel of unpaid members of research advisory committees; and initial duty station, permanent change of assignment, and related travel expenses.

III. Research Operations Support

A. Facilities Services: Provides security, fire protection, and other custodial services. It also provides maintenance of roads and grounds and of all administrative buildings and facilities. Finally, it provides rental of administrative buildings and all utility costs of administrative buildings.

B. Technical Services: Provides the Administrative Automatic Data Processing capability that supports Accounting, Payroll, Budgeting, Procurement, and Personnel as well as all the other Administrative functions. It also funds the Graphics and Photographic support to these functions. Finally, it funds the Installation-wide safety and public information programs.

C. Management and Operations: Funds the telephone, mail, and logistics systems, the administrative equipment and supplies, and the transportation system including the general purpose motor pools and the program support aircraft. It also funds the basic medical and environmental health programs. Finally, it funds printing and reproduction and all other support, such as small contract and purchases for the Center Directors staff and the Administrative functions. Included in this area is funding for the System Management offices at all centers which provides support and independent evaluations of projects and programs.

SUMMARY OF BUDGET PLAN BY FUNCTION
(Millions of Dollars)

	FY 2001 OP PLAN REVISED	FY 2002 INITIAL OP PLAN	FY 2003 PRES BUDGET
PERSONNEL AND RELATED COSTS	$1,792.7	$1,894.5	$2,013.8
TRAVEL	$53.1	$54.7	$59.2
RESEARCH OPERATIONS SUPPORT	$430.6	$634.7	$566.4
TOTAL PROGRAM PLAN	**$2,276.4**	**$2,583.9**	**$2,639.4**

Per the two-appropriation approach, the R&PM funds for FY 2002 and FY 2003, displayed here for information purposes only, are allocated in the HSF and SAT accounts against the appropriate Enterprises. This allocation is based on the distribution of the direct full time equivalent (FTE) people associated with each Enterprise, along with a share of other than direct R&PM funds allocated using the relative percentages of direct FTE's by Enterprises. These funds are identified within each Enterprise section under the title of "Institutional Support".

DETAIL OF BUDGET PLAN BY FUNCTION
(Millions of Dollars)

	FY 2001	FY 2002	FY 2003
I. Personnel and related costs	**$1,792.7**	**$1,894.5**	**$2,013.8**
A. Compensation and benefits	$1,731.9	$1,839.8	$1,951.1
1. Compensation	$1,431.2	$1,505.9	$1,596.6
2. Benefits	$300.7	$333.9	$354.5
B. Supporting costs	$60.8	$54.7	$62.7
1. Transfer of personnel	$8.6	$2.8	$3.1
2. Investigative services	$1.9	$1.6	$1.9
3. Personnel training	$50.3	$50.3	$57.7
II. Travel	**$53.1**	**$54.7**	**$59.2**
A. Program travel	$32.6	$33.0	$35.2
B. Scientific and technical development travel	$7.3	$7.0	$8.5
C. Management and operations travel	$13.2	$14.7	$15.5
III. Research operations support	**$430.6**	**$634.7**	**$566.4**
A. Facilities services	$120.2	$246.8	$182.7
B. Technical services	$162.8	$214.4	$218.2
C. Management and operations	$147.6	$173.5	$165.5
Total	**$2,276.4**	**$2,583.3**	**$2,639.4**

DISTRIBUTION OF BUDGET PLAN BY FUNCTION BY INSTALLATION
(Millions of Dollars)

FUNCTION	TOTAL NASA	JSC	KSC	MSFC	SSC	GSFC	ARC	DFRC	LARC	GRC	JPL	HQS
PERSONNEL AND RELATED COSTS												
FY 2001	1,792.7	312.8	169.4	252.5	24.3	304.6	157.1	57.7	212.2	176.2		125.9
FY 2002	1,894.5	326.9	175.6	263.3	25.1	319.4	163.2	57.3	219.5	183.4		160.8
FY 2003	2,013.8	344.4	186.5	286.4	26.2	333.5	176.0	59.8	231.5	192.2		177.3
TRAVEL												
FY 2001	53.1	8.4	5.8	7.8	0.8	7.7	3.8	1.5	5.5	3.8		8.0
FY 2002	54.7	8.9	5.6	6.4	0.8	7.6	3.8	1.5	5.1	4.0		11.0
FY 2003	59.2	8.9	5.6	6.3	0.7	7.7	4.7	1.8	6.1	4.7		12.7
RESEARCH OPERATIONS SUPPORT												
FY 2001	430.6	44.6	74.8	53.1	17.2	56.8	33.3	3.0	20.1	25.1		102.6
FY 2002	634.7	59.4	124.2	59.4	22.3	57.3	48.9	4.6	21.7	28.8	2.8	205.3
FY 2003	566.4	51.4	97.5	58.6	22.7	54.3	33.8	5.4	21.0	27.0	2.1	192.6
TOTAL												
FY 2001	2,276.4	365.8	250.0	313.4	42.3	369.1	194.2	62.2	237.8	205.1		236.5
FY 2002	2,583.9	395.2	305.4	329.1	48.2	384.3	215.9	63.4	246.3	216.2	2.8	377.1
FY 2003	2,639.4	404.7	289.6	351.3	49.6	395.5	214.5	67.0	258.6	223.9	2.1	382.6

SUMMARY OF BUDGET PLAN BY INSTALLATION
(Millions of Dollars)

	FY 2001	FY 2002	FY 2003
JOHNSON SPACE CENTER	$365.8	$395.2	$404.7
KENNEDY SPACE CENTER	$250.0	$305.4	$289.6
MARSHALL SPACE FLIGHT CENTER	$313.4	$329.1	$351.3
STENNIS SPACE CENTER	$42.3	$48.2	$49.6
AMES RESEARCH CENTER	$194.2	$215.9	$214.5
DRYDEN FLIGHT RESEARCH CENTER	$62.2	$63.4	$67.0
LANGLEY RESEARCH CENTER	$237.8	$246.3	$258.6
GLENN RESEARCH CENTER	$205.1	$216.2	$223.9
GODDARD SPACE FLIGHT CENTER	$369.1	$384.3	$395.5
JET PROPULSION LABORATORY	$0.0	$2.8	$2.1
HEADQUARTERS	$236.5	$377.1	$382.6
AGENCY TOTAL	$2,276.4	$2,583.9	$2,639.4

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY INSTALLATION

	FY 2001	FY 2002	FY 2003
JOHNSON SPACE CENTER	2,988	3,014	2,975
KENNEDY SPACE CENTER	1,831	1,852	1,870
MARSHALL SPACE FLIGHT CENTER	2,709	2,761	2,761
STENNIS SPACE CENTER	286	295	301
AMES RESEARCH CENTER	1,496	1,498	1,506
DRYDEN FLIGHT RESEARCH CENTER	635	600	595
LANGLEY RESEARCH CENTER	2,381	2,365	2,365
GLENN RESEARCH CENTER	1,945	1,923	1,924
GODDARD SPACE FLIGHT CENTER	3,228	3,317	3,323
HEADQUARTERS	1,011	1,167	1,217
TOTAL, FULL-TIME EQUIVALENTS	**18,510**	**18,792**	**18,837**

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**7,839**	**7,090**	**6,786**
International Space Station	2,565	1,793	1,607
Space Operations (SOMO)	358	381	267
Space Flight Operations (Space Shuttle)	1,934	1,986	1,920
Payload & ELV Support	287	256	243
Investment – HEDS	715	700	706
HEDS Mission Support	1,954	1,950	2,013
HEDS Reimbursable Activities	26	24	30
SPACE SCIENCE	**2,022**	**2,439**	**2,453**
Major Development Programs	289	271	228
Payloads Program	21	10	10
Explorer Program	160	118	93
Mars Exploration Program	80	75	76
Discovery Program	15	14	5
Operating Missions	68	92	77
Technology Program	317	487	567
Research Program	397	482	474
Space Science Mission Support	675	890	923
BIOLOGICAL & PHYSICAL RESEARCH	**427**	**1242**	**1273**
Biological & Physical Research	332	381	375
ISS Research Capabilities	0	649	650
B&PR Mission Support	95	212	248
EARTH SCIENCE	**1,913**	**1,747**	**1,848**
Earth Observing System Program	400	399	392
Earth Probes Program	122	134	125

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

	FY 2001	FY 2002	FY 2003
Operating Missions	31	25	126
Research & Technology	609	548	548
Investment – ES	7	4	4
Earth Science Mission Support	679	570	590
ES Reimbursable Activities	65	67	63
AERO-SPACE TECHNOLOGY	**6,170**	**6,140**	**6,344**
Aero-Space Focused Programs	1,728	1,508	0
Aero-Space Base	2,333	2,774	0
Commercial Technology Program	200	196	250
Space Base Program	311	8	0
Aviation Safety	0	0	326
Vehicle Systems	0	0	1,908
Airspace Systems	0	0	206
2nd Generation RLV Focused	0	0	841
Space Transfer & Launch Tech	0	0	298
Computing Info & Communications Tech	0	0	501
Engineering For Complex Systems	0	0	36
Enabling Concepts & Technologies	0	0	243
Investment – AST	9	9	9
Aero-Space Technology Mission Support	1,589	1,645	1,726

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM

	FY 2001	FY 2002	FY 2003
SAFETY AND MISSION ASSURANCE	**97**	**92**	**91**
Safety And Mission Assurance	97	92	91
ACADEMIC PROGRAMS	**42**	**42**	**42**
Academic Programs	42	42	42
Total full-time equivalents (FTES)	**18,510**	**18,792**	**18,837**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

LYNDON B. JOHNSON SPACE CENTER

ROLES AND MISSIONS

LEAD CENTER RESPONSIBILITIES:

International Space Station (ISS) - JSC technical responsibilities include development of a set of facilities and systems to conduct operations aboard the Space Station including on-orbit control of the Space Station. The Center provides institutional personnel as well as engineering and testbed support to the Space Station program. This includes test capabilities, the provision of Government Furnished Equipment, and engineering analysis support for the work of the prime contractor, its major subcontractors, and NASA system engineering and integration efforts.

Space Shuttle - JSC will provide development, integration, and operations support for the Mission Control Center (MCC), the Shuttle Mission Simulator (SMS), and other ground facilities needed for Space Shuttle Operations. JSC will provide Space Shuttle operational flight program management including system integration, crew equipment modification and processing, crew training, flight mission planning and operations, and procurement of Orbiter hardware.

Biomedical Research and Countermeasures/Advanced Human Support Technologies/Space Medicine - As part of these activities, JSC will develop, coordinate and implement research into human physiological changes associated with the space flight environment and develop effective countermeasures to ensure crew health and optimal performance during all phases of flight.

PERFORMING CENTER RESPONSIBILITIES:

Space Launch Initiative – JSC has established a Space Launch Initiative (SLI) Project Office to manage technology developments related to human space vehicles, including crew transfer vehicle, crew and cargo transfer vehicle, crew escape and survivability, mission planning and flight operations, and related activities. The Office will provide architectural definition, integrated assessments, technology development, advanced operations development, and integration of flight demonstrations. The Office will also coordinate and integrate JSC support to SLI technology projects undertaken by other NASA centers.

Payload and ELV Support - JSC will conduct concept studies and development on flight systems and options for human transportation. JSC provides support to payload operations and support equipment, and technology program support.

Space Communications and Data Systems - JSC provides the administration and management of the Consolidated Space Operations Contract (CSOC).

HEDS Investment Support – This activity supports the center's Engineering Technical Base and Advanced Project requirements. These requirements are largely engineering lab support activities that are tied to Space Station and Space Shuttle program needs.

Space Science – JSC is responsible for leadership in the field of astromaterials and operates NASA's astromaterial curatorial facility for extraterrestrial sample materials. The Center supports the Agency's Space Science goals through research, information dissemination, and interaction with the scientific community. This research includes planetary science, astrobiology, space debris, and sample material handling. The primary focus is on the composition, structures, and evolutionary histories of astromaterials to further our understanding of the solar system and aid in the planning for future missions.

Biological and Physical Research - The JSC has established a Program for the support of biotechnology applications in microgravity in order to study growth factors, medical chemo/immunotherapeutic techniques, and human tissue transplantation. The program will integrate life science flight experiments for Spacehab and the ISS, operate integrated payload systems, and train mission specialists in the science aspects of their missions.

Center Management and Operations - Provides management, administrative, and financial oversight of NASA programmatic elements under JSC cognizance. In addition, the Center provides for the operation of and maintenance of the institutional facilities, systems, and equipment. Coordinates Agency wide policy and the processing for all foreign travel. Also included in this area is the System Management office which provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
JOHNSON SPACE CENTER

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**2,790**	**2,701**	**2,666**
International Space Station	1,136	1,091	1,027
Space Operations (SOMO)	46	44	44
Space Flight Operations (Space Shuttle)	760	756	734
Investment – HEDS	300	279	279
HEDS Mission Support	548	531	582
HEDS Database Adjustment	0	0	0
SPACE SCIENCE	**52**	**52**	**51**
Mars Exploration Program	7	2	2
Discovery Program	0	1	1
Operating Missions	1	0	0
Technology Program	16	13	13
Research Program	28	26	25
Space Science Mission Support	0	10	10
BIOLOGICAL & PHYSICAL RESEARCH	**98**	**205**	**202**
Biological & Physical Research	98	98	90
ISS Research Capabilities	0	67	69
B&PR Mission Support	0	40	43
AERO-SPACE TECHNOLOGY	**24**	**35**	**35**
Aero-Space Focused Programs	1	7	0
Aero-Space Base	5	4	0
Commercial Technology Program	18	17	17
2nd Generation RLV Focused	0	0	11
Aero-Space Technology Mission Support	0	7	7
SAFETY AND MISSION ASSURANCE	**14**	**13**	**13**
Safety And Mission Assurance	14	13	13
ACADEMIC PROGRAMS	**10**	**8**	**8**
Academic Programs	10	8	8
	2,988	**3,014**	**2,975**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

JOHN F. KENNEDY SPACE CENTER

ROLES AND MISSIONS

LEAD CENTER RESPONSIBILITIES:

Payload Carriers and Support - KSC will provide technical expertise, facilities and capabilities to perform payload buildup, test and checkout, integration and servicing of multiple payloads; development, operation, logistics and maintenance of GSE; transportation of payloads and supporting equipment to the Space Shuttle; and integration and installation of the payloads into the Space Shuttle. The KSC develops, activates, operates, and maintains the Payload Carrier facility system, GSE, and processes to enable efficient launch site processing of carriers and payloads. The Center also provides pre- and post-flight support for life science flight experiments.

Expendable Launch Vehicle Launch Mission Support -KSC will provide government insight/oversight of all launch vehicle and payload processing and checkout activities for all NASA contracted expendable launch vehicle and upper stage launch services both at KSC and the Vandenburg Air Force Base.

PERFORMING CENTER RESPONSIBILITIES:

Space Station - The KSC provides launch site logistics support, re-supply, and customer utilization. The KSC serves as the primary agent for management and integration of ground processes for all U.S. launched International Space Station (ISS) elements from manufacture and assembly through verification and launch. The KSC develops and maintains ISS flight systems expertise to support the ISS on-orbit mission and retains technical and operational experience within NASA and KSC for ground processing and verification of space flight hardware for follow-on programs.

Space Shuttle - KSC will provide the technical expertise and services for Space Shuttle processing, launch and landing operations, and program integrated logistics. This includes Shuttle element processing; SRM/SRB element buildup; Shuttle element and payload integration; and operation and maintenance of the Shuttle processing, launch, and landing facilities, systems, associated technical infrastructure, and Ground Support Equipment (GSE).

Center Management and Operations - KSC will provide administrative and financial services in support of Center management and will provide for the operation and maintenance of the institutional facilities, systems, laboratories, testbeds, associated technical infrastructure, and equipment. Will serve as NASA's focal point for spaceport and range technology development efforts to provide advanced technologies, systems, and techniques increased in support of safety, security and reduce the cost of access to space. Coordinates the development of Agency policy and manages the NASA

relocation contract. Also included in this area is the System Management office which provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
JOHN F. KENNEDY SPACE CENTER

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**1,753**	**1,779**	**1,794**
International Space Station	332	341	340
Space Operations (SOMO)	1	7	15
Space Flight Operations (Space Shuttle)	774	815	788
Payload & ELV Support	220	220	220
Investment – HEDS	94	68	75
HEDS Mission Support	322	318	346
HEDS Database Adjustment	0	0	0
HEDS Reimbursable Activities	10	10	10
BIOLOGICAL & PHYSICAL RESEARCH	**16**	**20**	**21**
Biological & Physical Research	12	15	16
B&Pr Mission Support	4	5	5
AERO-SPACE TECHNOLOGY	**44**	**34**	**36**
Aero-Space Focused Programs	20	5	0
Commercial Technology Program	13	21	21
2nd Generation Rlv Focused	0	0	7
Aero-Space Technology Mission Support	11	8	8
SAFETY AND MISSION ASSURANCE	**7**	**7**	**7**
Safety and Mission Assurance	7	7	7
ACADEMIC PROGRAMS	**11**	**12**	**12**
Academic Programs	11	12	12
Total full-time equivalents (FTEs)	**1,831**	**1,852**	**1,870**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

GEORGE C. MARSHALL SPACE FLIGHT CENTER

ROLES AND MISSIONS

LEAD CENTER RESPONSIBILITIES:

Space Launch Initiative (SLI) – The SLI is aimed at improving access to space for 21st century missions. The SLI projects represent a partnership that stretches across the country and throughout the Agency. As NASA's Center of Excellence for Space Propulsion, the 2nd Generation RLV Propulsion Office also is located at MSFC. Propulsion is the key ingredient for a safer, more reliable, and more cost-effective space transportation system. The Propulsion Office manages the development of all propulsion elements and coordinates its activities to assure synergy with current NASA, Department of Defense, and commercial RLV activities.

Space Transfer & Launch Technology (STLT) – STLT is focused on third generation reusable launch vehicle technologies that has as its primary focus three demonstrator programs. Two of the programs, Integrated Systems Testing of an Airbreathing Rocket (ISTAR), Revolutionary Turbine Accelerator (RTA) are ground demonstrators where the X-43-C is a flight demonstrator. Other technology projects, e.g. airframe and Propulsion Research & Technology, support the development of vision vehicle technologies in materials, airframe, and vehicle systems.

Biological and Physical Research - MSFC is responsible for implementing the Agency's microgravity initiatives through the Microgravity Research and Space Product Development programs. MSFC's efforts provide scientific and commercial researchers the unique opportunity to use the low gravity environment of space as a catalyst to generate new knowledge, products, and services that improve the quality of life on earth. MSFC is also responsible for implementing the Materials Science and Biotechnology Science disciplines and the Glovebox Program within the Microgravity Research Program.

Space Science - MSFC is responsible for managing the overall design, development, integration, test, and flight operations of the Gravity Probe–B (GP–B) flight experiment

PERFORMING CENTER RESPONSIBILITIES:

Space Shuttle – The Space Shuttle Projects Office (SSPO) manages the performance of MSFC and industry personnel and resources in the planning, design, engineering, integration, development, production, testing, upgrade, delivery and operations of the Space Shuttle Main Engines (SSME), External Tank (ET), Solid Rocket Booster (SRB), and the Reusable Solid Rocket Motor (RSRM), guiding effective implementation of safety, schedule, performance and cost goals. MSFC

continues to streamline operations and implement upgrades to enhance safety, meet the manifest, improve mission supportability, and improve the system.

International Space Station (ISS) – MSFC plays a vital role in building, operating, and utilizing the ISS for NASA. Specifically, MSFC provides management oversight of Nodes 2 and 3, which will be provided by the Italian Space Agency and their contractor, Alenia. MSFC is responsible for the development of the regenerative life support systems for the ISS crew and the research animals. MSFC's Testing, Manufacturing and Support Team will provide technical expertise to ISS design and development teams. MSFC is also responsible for the management, integration and execution of payload operations and utilization activities on board the ISS.

Space Optics Manufacturing Technology - MSFC leads the Agency in the development of lightweight, large-aperture Space Optics Manufacturing Technology for use in achieving the mission goals of NASA's strategic enterprises.

Space Science Research - MSFC manages the Solar B and the GLAST Burst Monitor, and conducts fundamental research in six disciplines—cosmic-ray physics, gamma-ray astronomy, x-ray astronomy, solar physics, space plasma physics and astrobiology. MSFC manages the operation of the MSFC developed Chandra X-ray Observatory through the Operations Control Center and the Chandra X-ray Center at the Smithsonian Astrophysical Observatory in Cambridge, MA.

Earth Science Research - Through the Global Hydrology and Climate Center (GHCC), a joint venture with academia, MSFC engages in research, education, and the development of Earth science applications. The GHCC focuses on using advanced technology to observe and understand the global climate system and apply this knowledge to agriculture, urban planning, water resource management, and operational meteorology.

National Space Science and Technology Center (NSSTC) - The NSSTC, headquartered in Huntsville, Alabama, is a research and education institution that provides an environment for selected key scientific disciplines. It consists of researchers and resources from government, academia and industry collaborating in an environment that enables cutting edge basic and applied research and fosters education of the next generation of scientists and engineers. The NSSTC is a partnership between NASA and the State of Alabama through the Alabama Space Science & Technology Alliance (SSTA) to perform research meeting the nation's needs.

Center Management and Operations - MSFC provides administrative and financial services in support of Center management and provides for the operation and maintenance of the institutional facilities, systems and equipment. A broad range of personnel, facilities, and operational support services are required to support Agency functions assigned to MSFC. MSFC has responsibility for the following Agency support activities: Communications Architecture and Providing Agency WAN Services; NASA Automated Data Processing Consolidation Center; NASA Digital Television Transition; Sustaining Support for Agencywide Administrative Systems; NASA Integrated Service Network; NASA Technical Standards Program; NASA Acquisition Internet Service; NASA Operational Environment Team; National Center for Advanced Manufacturing; NASA Engineering Infrastructure; Earned-Value Management; Defense Contract Administrative Service Financial Management Support; Integrated Financial Management Program Core Financial Project; Integrated Financial Management Program

Integration Project and the Spacelink. Also included in this area is the System Management office which provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
GEORGE C. MARSHALL SPACE FLIGHT CENTER

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**1,719**	**1,185**	**1,138**
International Space Station	704	243	190
Space Operations (SOMO)	11	12	12
Space Flight Operations (Space Shuttle)	383	393	376
Payload & ELV Support	20	10	13
Investment - HEDS	272	300	299
HEDS Mission Support	329	227	248
SPACE SCIENCE	**183**	**209**	**163**
Major Development Programs	23	30	16
Payloads Program	10	10	10
Operating Missions	2	2	2
Technology Program	47	38	49
Research Program	65	84	69
Space Science Mission Support	36	45	17
BIOLOGICAL & PHYSICAL RESEARCH	**92**	**539**	**503**
Biological & Physical Research	76	109	111
ISS Research Capabilities	0	344	314
B&PR Mission Support	16	86	78
EARTH SCIENCE	**48**	**49**	**48**
Earth Observing System Program	2	2	1
Research & Technology	38	39	39
Earth Science Mission Support	8	8	8
AERO-SPACE TECHNOLOGY	**644**	**756**	**886**
Aero-Space Focused Programs	368	465	0

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
GEORGE C. MARSHALL SPACE FLIGHT CENTER (continued)

	FY 2001	FY 2002	FY 2003
Aero-Space Base	120	131	0
Commercial Technology Program	30	27	76
Space Base Program	17	8	0
Vehicle Systems	0	0	12
2nd Generation Rlv Focused	0	0	549
Space Transfer & Launch Tech	0	0	76
Computing Info & Communications Tech	0	0	3
Enabling Concepts & Technologies	0	0	28
Aero-Space Technology Mission Support	109	125	142
SAFETY AND MISSION ASSURANCE	**12**	**12**	**12**
Safety And Mission Assurance	12	12	12
ACADEMIC PROGRAMS	**11**	**11**	**11**
Academic Programs	11	11	11
Total full-time equivalents (FTES)	**2,709**	**2,761**	**2,761**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

JOHN C. STENNIS SPACE CENTER

ROLES AND MISSIONS

LEAD CENTER RESPONSIBILITIES:

Rocket Propulsion Testing - As the Lead Center for Propulsion Testing, SSC operates, maintains, and manages a propulsion test capability that includes test facilities at JSC/WSTF, MSFC, and GRC/Plum Brook and related systems for development, certification, and acceptance of rocket propulsion systems and components. The Center provides, maintains, and manages the facilities and the related capabilities required for the continued development and acceptance testing of the Space Shuttle Main Engines. SSC also maintains and supports the Center's technical core laboratory and operations to enable SSC to conduct advanced propulsion test technology research and development for government and commercial propulsion programs.

Earth Science - Through the Remote Sensing Applications Program, SSC enhances U.S. economic competitiveness via commercial partnership programs that apply remote sensing technologies in business applications and reduce new product development costs. As part of the Research and Analysis – Applications Program, SSC conducts fundamental and applied research, which increases our understanding of environmental systems sciences, with emphasis on coastal research of both land and oceans. Starting in FY02, Commercial Remoter Sensing was absorbed into other areas within Applications.

PERFORMING CENTER RESPONSIBILITIES:

Aerospace Technology - Through the Technology Transfer and Small Business Innovative Research programs, SSC broadens and accelerates the development of spin-off technologies derived from national investments in aerospace research. SSC also supports the development of new and innovative propulsion technologies through the Advanced Space Transportation Program that supports the Agency goal of reducing the cost of access to space. Included in this effort is the propulsion test technology research for the Space Launch Initiative.

Center Management and Operations - SSC provides administrative and financial services in support of Center management and provides for the operation and maintenance of the institutional facilities, systems, and equipment. The Center provides, operates, maintains, and manages the institutional base and laboratories required to support NASA programs, Commercial programs, and other Federal and State agencies and organizations resident at the SSC. Also included in this area is the System Management office which provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
STENNIS SPACE CENTER

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**126**	**148**	**153**
Space Flight Operations (Space Shuttle)	11	13	13
Investment – HEDS	49	53	53
HEDS Mission Support	50	68	67
HEDS Database Adjustment	0	0	0
HEDS Reimbursable Activities	16	14	20
EARTH SCIENCE	**48**	**45**	**56**
Research & Technology	26	26	33
Earth Science Mission Support	22	19	23
AERO-SPACE TECHNOLOGY	**111**	**101**	**91**
Aero-Space Focused Programs	44	37	0
Aero-Space Base	14	14	0
Commercial Technology Program	5	5	5
2nd Generation Rlv Focused	0	0	47
Aero-Space Technology Mission Support	48	45	39
SAFETY AND MISSION ASSURANCE	**1**	**1**	**1**
Safety And Mission Assurance	1	1	1
Total full-time equivalents (FTES)	**286**	**295**	**301**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

GODDARD SPACE FLIGHT CENTER

ROLES AND MISSIONS

LEAD CENTER RESPONSIBILITIES:

Space Science - GSFC is the Lead Center for two of the four science themes in the Space Science Enterprise: Sun-Earth Connections and Structure & Evolution of the Universe. The objectives of Sun-Earth Connections are to seek a scientific understanding of the why Sun varies and to determine how solar variability affects life and society. Structure & Evolution of the Universe is comprised of three fundamental scientific quests: explaining the structure of the universe and forecasting our cosmic destiny, exploring cycles of matter and energy in the evolving universe, and examining the ultimate limits of gravity and energy in the universe. In support of these objectives, GSFC manages many currently operating missions, such as the Hubble Space Telescope, the Microwave Anisotropy Probe, and the Thermosphere-Ionosphere-Mesosphere-Energetics and Dynamics mission. GSFC also manages a large number of missions in development, including all missions in the Explorers program, missions in the Living With a Star program, as well as several major strategic missions, such as the Next Generation Space Telescope. GSFC also conducts world-class space science research in such areas as astrophysics, solar physics, high-energy astronomy (x-ray and gamma ray), optical astronomy, microwave/infrared astronomy, and radio astronomy. Other activities include managing the NASA's sounding rocket program and scientific balloon research program.

Earth Science – GSFC is the Lead Center for the Earth Science Enterprise. In this role, GSFC is responsible for the management of the Earth Observing System (EOS) program, operation of orbiting Earth observing spacecraft, and development of emerging technologies in support of future Earth observing missions. The EOS program is the centerpiece of NASA's Earth Science Enterprise. The EOS is comprised of integrated scientific investigation activities whose primary objective is to record global change and to observe regional-to-global processes. The EOS will document global change over a 15-year period to provide long-term, consistent data sets for use in modeling and understanding global processes. This process and modeling research effort will provide the basis for establishing predictive global change models for policy makers and scientists.

GSFC manages Earth Explorers and New Millennium flight projects; and manages, on a reimbursable basis, the acquisition of meteorological observing spacecraft for the National Oceanic and Atmospheric Administration (NOAA). Conducts science correlation measurements from balloons, sounding rockets, aircraft, and ground installations.

GSFC is the Lead Center for Earth Science technology development activities. Examples of these technologies include advanced techniques to accelerate data processing for the Earth Observing system, development of unique coatings, detector materials and electronics, and state of the art optics for future Earth orbiting missions.

GSFC is the Lead Center for the Independent Verification & Validation (IV&V) Facility in Fairmont, West Virginia. The IV&V Facility is responsible for providing independent assessments of project software and for the management of all software IV&V efforts within the Agency.

PERFORMING CENTER RESPONSIBILITIES:

Space Shuttle/Payload and ELV Support - GSFC manages flights of the Hitchhiker, a reusable carrier system that provides increased flight opportunities with reduced lead-time while maximizing Space Shuttle load factors and minimizing space flight costs. GSFC also manages and coordinates the Agency's Get Away Special (GAS) program.

Space Science - GSFC is a Performing Center for two of the four science themes in the Space Science Enterprise: the Astronomical Search for Origins and Solar System Exploration. In addition to managing two key missions in the Origins theme (the Hubble Space Telescope and the Next Generation Space Telescope), GSFC develops science instruments and technologies targeted at improving instruments, on-board spacecraft systems, and subsystems. GSFC has also conducted scientific research in support of the Origins program, planetary exploration, and investigations into other bodies in the Solar System

Earth Science – As an integral partner in the Agency's High Performance Computing and Communications (HPCC) program, GSFC leads an effort to enhance the infusion of HPCC technologies into the Earth community through the provision of advanced computer architectures and communication technologies.

Aerospace Technology - The Wallops Flight Facility provides institutional and technical support to Langley Research Center, other NASA Centers, and commercial users who conduct flight studies of new approach and landing procedures using the latest in guidance equipment and techniques, pilot information displays, human factors data, and terminal area navigation. Promotes private sector investment in space-based technologies through the transfer of technologies that derive from NASA's programs and activities.

Space Communications and Data Systems- Research and technology involves the investigation and development of advanced systems and techniques for spacecraft communications and tracking, command and control, and data acquisition and processing. The primary objectives are to apply technology and develop advanced capabilities to meet the tracking and data processing requirements of new missions and to improve the cost effectiveness and reliability of flight mission support.

GSFC manages a number of critical program elements, including operation of the Tracking and Data Relay Satellite System (TDRSS); the development of the replenishment TDRSS spacecraft; mission control, data processing, and orbit/attitude computation support; operating the Space Tracking and Data Network (STDN), the NASA Communications (NASCOM) Network, and the Aeronautics, Balloons and Sounding Rocket Program.

The NASCOM Network links the stations of the Deep Space Network (DSN), STDN, TDRSS, and other tracking and data acquisition elements with control centers and data processing and computation centers.

Center Management and Operations - Provides administrative and financial services in support of Center management and provides for the operation and maintenance of the institutional facilities, systems, and equipment. Also included in this area is the System Management office which provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
GODDARD SPACE FLIGHT CENTER

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**438**	**440**	**313**
International Space Station	2	0	0
Space Operations (SOMO)	229	253	146
Payload & ELV Support	47	26	10
HEDS Mission Support	160	161	157
SPACE SCIENCE	**1,357**	**1,673**	**1,718**
Major Development Programs	212	188	166
Payloads Program	11	0	0
Explorer Program	159	114	89
Mars Exploration Program	1	0	0
Discovery Program	9	9	0
Operating Missions	65	90	75
Technology Program	222	357	420
Research Program	238	305	312
Space Science Mission Support	440	610	656
EARTH SCIENCE	**1,301**	**1,089**	**1,168**
Earth Observing System Program	345	333	331
Earth Probes Program	91	74	64
Operating Missions	25	22	123
Research & Technology	290	245	236
Investment – ES	7	4	4
Earth Science Mission Support	478	344	347
ES Reimbursable Activities	65	67	63

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
GODDARD SPACE FLIGHT CENTER (continued)

	FY 2001	FY 2002	FY 2003
AERO-SPACE TECHNOLOGY	**112**	**97**	**107**
Aero-Space Base	5	10	0
Commercial Technology Program	43	49	53
Space Base Program	20	0	0
Computing Info & Communications Tech	0	0	4
Engineering For Complex Systems	0	0	7
Aero-Space Technology Mission Support	44	38	43
SAFETY AND MISSION ASSURANCE	**16**	**14**	**13**
Safety And Mission Assurance	16	14	13
ACADEMIC PROGRAMS	**4**	**4**	**4**
Academic Programs	4	4	4
Total full-time equivalents (FTES)	**3,228**	**3,317**	**3,323**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

AMES RESEARCH CENTER

ROLES AND MISSIONS

LEAD CENTER RESPONSIBILITIES:

Center of Excellence for Information Technology - Provides Agency-wide leadership and strategically maintains or increases the Agency's preeminent position in Information technology by serving as the NASA Center of Excellence for Information Technology.

Aerospace Technology

- Airspace Systems (AS) - Ames Research Center (ARC) is responsible for developing technology to increase the safety and capacity of the national and international airspace for: (1) the modernization and improvement in the air-traffic management system; (2) pioneering the development and validation of advanced technology concepts, methods, and procedures, and for transferring them to the user and regulatory communities to enable major increases in safe aircraft operations; and (3) the introduction of new vehicle classes that can reduce airport congestion and expand the use of presently under utilized airspace and airports. To support these goals, ARC conducts research in aerospace operations automation technologies and modeling and provides high-fidelity flight simulations with an emphasis on enhancing National Airspace capacity and safety.

- Computing, Information and Communications Technology (CICT) - ARC is the lead for integrative research in information technology, biotechnology and nanotechnology towards applications in NASA's missions. Provides leadership for high end computing and networking within the Agency. ARC technical responsibilities include the development and demonstration of revolutionary computing, information and communications technologies. Specifically, ARC is responsible for the technical leadership and implementation of research efforts in such areas as advanced computing and networking, information environments, autonomy, human-centered systems, intelligent data understanding and fundamental information technologies, including high-confidence systems and bio-nanotechnology. Also provides key research personnel to support the integration and infusion of these technologies into NASA aerospace, space science, Earth Science and Human Space Flight missions. Provides key personnel and institutional support for the management of the overall CICT Program, and three of the four major projects within CICT (Computing, Networking, and Information Systems Project, Intelligent Systems Project and the Information Technology Strategic Research Project).

- Engineering for Complex Systems (ECS) - ECS addresses issues identified in multiple agency reports (NIAT, SIAT, mishap reports, etc.) to enable successful complex systems (hardware, software, people) across engineering activities performed throughout the agency and in private industry. ARC conducts research and technology development that supports life cycle risk management and the associated knowledge management systems. Key areas of focus are engineering design, software resiliency, human and organizational risk, and an integrated system risk perspective, with strong application of knowledge engineering and model-based reasoning technologies as an enabling vehicle.

Space Science - ARC has the Agency lead role in Astrobiology (the study of life in the universe), which focuses on the origin, adaptation, and destiny of life in the universe. Research includes advanced laboratory and computation facilities for astrochemistry; planetary protection; planetary atmosphere modeling, including relationships to the atmosphere of the Earth; the formation of stars and planetary systems; and an infrared technology program to investigate the nature and evolution of astronomical systems. Research and development in advanced information technologies, conducted by various NASA/university teams, are directed toward significantly increasing the efficiency of the Stratospheric Observatory for Infrared Astronomy (SOFIA) as it becomes operational. ARC is the lead Center for information technology efforts in the cross-enterprise spacecraft technology program.

Biological and Physical Research - ARC has the Agency lead roles in the Fundamental Biology program and the Biomolecular Systems Research program. These synergistic programs examine the adaptation of life forms to reduced gravity and the biotechnology which supports this scientific pursuit. Research continues into the effects of gravity on living systems using spaceflight experiments, ground simulation, and hypergravity facilities to understand how gravity affects the development, structure, and functions of living systems. Development continues on the Space Station Biological Research Project, the key life science facility aboard the International Space Station.

PERFORMING CENTER RESPONSIBILITIES:

Aerospace Technology

- Conducts aerospace vehicle research and technology development associated with autonomy and integrated vehicle health management. Conducts research on advanced thermal protection systems and performs arcjet testing to meet national needs for access to space and planetary exploration.

- Performs lead project responsibility for the Aviation Safety Program (AvSP) in the areas of Aviation System Monitoring and Modeling (ASMM) and System Wide Accident Prevention (SWAP). ARC manages technology and human factors research related to monitoring the National Airspace System (NAS) and modeling of the effectiveness of candidate safety technology interventions for reductions in the rate of aviation incidents and accidents. In addition, ARC will direct development of human behavioral models appropriate to the aviation context, and advances in aircraft maintenance and pilot/mechanic training. ARC will provide technology development assessments, resources management, and integration of ARC research activities with program flight demonstrations.

Space Science – Research and development in advanced information technologies are directed toward significantly increasing the efficiency of SOFIA as it becomes operational. ARC is the lead Center for information technology efforts in the cross-enterprise spacecraft technology program.

Biological and Physical Research - Also studies options for preventing problems in crew health and psychophysiology during and after extended spaceflight. ARC has a primary focus on advanced physical/chemical technologies for life support, including research into all aspects of regenerative life support. Research is conducted in the areas of ecosystems and health monitoring.

Earth Science - Builds instruments and computer models for the measurement and analysis of atmospheric constituents and properties from aircraft platform are being developed. Performs applied research and development to enhance the use of remote and in-situ sensing technology for Earth resources applications continues. Provides information systems and high end computing support for Earth Sciences knowledge acquisition.

Center Management and Operations - Provides management, administrative and financial oversight of NASA programmatic elements under ARC cognizance. Provides for the safe and effective operation and maintenance of supporting facilities, systems, and equipment. Serves as the Principal Center for the Agency in the following areas: information technology security, human resources operations, and directives management. Also included in this area is the System Management office that provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
AMES RESEARCH CENTER

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**110**	**32**	**2**
International Space Station	80	0	0
HEDS Mission Support	30	32	2
SPACE SCIENCE	**206**	**219**	**218**
Major Development Programs	53	52	45
Mars Exploration Program	18	23	22
Technology Program	15	20	25
Research Program	65	64	65
Space Science Mission Support	55	60	61
BIOLOGICAL & PHYSICAL RESEARCH	**72**	**159**	**193**
Biological & Physical Research	53	55	54
ISS Research Capabilities	0	83	84
B&PR Mission Support	19	21	55
EARTH SCIENCE	**82**	**86**	**86**
Earth Observing System Program	7	7	7
Research & Technology	53	55	55
Earth Science Mission Support	22	24	24
AERO-SPACE TECHNOLOGY	**1,021**	**998**	**1,003**
Aero-Space Focused Programs	262	199	0
Aero-Space Base	425	518	0
Commercial Technology Program	3	7	7
Space Base Program	33	0	0
Aviation Safety	0	0	25
Vehicle Systems	0	0	103
Airspace Systems	0	0	122

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
AMES RESEARCH CENTER (continued)

	FY 2001	FY 2002	FY 2003
2nd Generation RLV Focused	0	0	32
Space Transfer & Launch Tech	0	0	31
Computing Info & Communications Tech	0	0	385
Engineering For Complex Systems	0	0	19
Aero-Space Technology Mission Support	298	274	279
SAFETY AND MISSION ASSURANCE	**1**	**0**	**0**
Safety And Mission Assurance	1	0	0
ACADEMIC PROGRAMS	**4**	**4**	**4**
Academic Programs	4	4	4
Total full-time equivalents (FTEs)	**1,496**	**1,498**	**1,506**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

DRYDEN FLIGHT RESEARCH CENTER

CENTER ROLES AND MISSIONS

PERFORMING CENTER RESPONSIBILITIES:

Vehicle Systems Program- Aerospace Flight Research and Advanced Vehicle Concepts

DFRC develops, manages, and maintains facilities and test bed aircraft to support safe, timely, and cost effective NASA flight research with piloted and unpiloted research aircraft and to support industry, university, and other government agency flight programs.

DFRC pioneers the identification, development, verification, transfer, and application of high-payoff aeronautical technologies. The program matures promising new aeronautics technologies into practical, ready-for-application technologies. Demonstration in the "real world" flight environment, integrated with other technologies in a practical package is critical to the transfer of these promising technologies into use in future aircraft and atmospheric-capable spacecraft. These activities have a large emphasis in closing the gap on experimental aircraft. Experimental aircraft provide a mechanism to validate design tools and new technology. Early development and validation of new concepts can be evaluated in a realistic environment, which allows lower cost developments and more rapid transfer of technology to allow low-cost space access.

Fiscal Year 2003 promises to be a productive year of flight research. In ERAST, the Flight Research program will demonstrate the Helios vehicle for long duration flight in FY03. F-15B flight testbed activities this year may include: Laminar Flow, Space-based Telemetry And Range Safety (STARS), Nielsen Phase II SBIR, and the F-5 Shaped Boom Demonstration. In pursuit of efficiency and affordability an F-18 testbed aircraft will demonstrate Active Aeroelastic Wing (AAW) technology.

Advanced Vehicle Concepts activities at DFRC will focus on the following specific activities: Intelligent Flight Control System (IFCS) Generation II flight testing on the F-15 flight test vehicle. The C-17 Research Flight Computing System (REFLCS) flight validation activities will begin during this year. The REFLCS will provide an unparalleled in-flight research capability. With follow on IFCS flight test activities using the REFLCS. The X-43 Hyper-X project is supporting the development of the second vehicle for flight test in early FY03.

Other experiments and technology developments within the program are concerned with validating new designs and design tools. As new designs are developed and matured, a mechanism is needed to validate those designs and the tools used to design the systems. The results generate and gather the information necessary to validate both the designs and the tools used for the designs. Often, these activities generate basic data to build new tools for more efficient design cycles.

The DFRC Western Aeronautical Test Range (WATR) provides communications, tracking, data acquisition, and mission control for a wide variety of aeronautic and aerospace vehicles. Customers of the WATR include other NASA Centers, other federal agencies and the aerospace industry. The test range was extended to the West Coast to support the X-43 launch over the Pacific Ocean. The WATR provides the range safety ground station to ensure public safety during flight of unpiloted vehicles.
International Space Station—X-38/Crew Return Vehicle – DFRC support of the space station program includes the conduct of technology development and flight test of the X-38 prototype emergency Crew Return Vehicle (ACRV) and provides on-orbit tracking and communications through the WATR.

Space Shuttle Program--Space Shuttle Ground Ops and Space Communications – DFRC serves as an alternate landing site and provides operational and technical support for the conduct of Space Shuttle missions. Other support includes on-orbit tracking and communications (WATR).

Earth Science – DFRC conducts flight operations in support of Airborne Science Missions for data collection and observations.

The NASA DC-8 Airborne Laboratory Program at NASA/Dryden Flight Research Center operates a DC-8-72 aircraft to acquire data for airborne science research. The platform aircraft provides for a wide variety of experiments, collecting data in support of scientific projects, to serve the world scientific community. Included in this community are NASA, other federal, state, academic, and foreign investigators. Data gathered at flight altitude and by remote sensing from the DC-8 have been used in many studies. Scientific investigators use the aircraft for earth, atmospheric and celestial observations. Research includes development of new sensors, and methodology for conducting such observations. Data from operational sensors as well as newly developed instruments are used in applications programs examining subjects such as ozone depletion, tropical rain forest destruction, tropical disease vectors, wildfire investigations and geologic remote sensing.

The ER-2 is a reconnaissance platform. These high-altitude aircraft are used as platforms for investigations that cannot be accomplished by sensor platforms of the private sector. The ER-2, flying at the edge of space, can scan shorelines, measure water levels, help fight forest fires, profile the atmosphere, assess flood damage, and sample the stratosphere.

Center Management and Operations - Provides administrative services in support of Center management and provides for the operation and maintenance of the institutional facilities, systems, and equipment. Also included in this area is the System Management office that provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
DRYDEN FLIGHT RESEARCH CENTER

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**129**	**28**	**8**
International Space Station	77	0	0
Space Operations (SOMO)	15	15	0
Space Flight Operations (Space Shuttle)	3	6	6
HEDS Mission Support	34	7	2
EARTH SCIENCE	**43**	**45**	**46**
Research & Technology	29	35	35
Earth Science Mission Support	14	10	11
AERO-SPACE TECHNOLOGY	**460**	**524**	**538**
Aero-Space Focused Programs	137	14	0
Aero-Space Base	210	378	0
Commercial Technology Program	3	2	3
Aviation Safety	0	0	6
Vehicle Systems	0	0	356
2nd Generation RLV Focused	0	0	12
Space Transfer & Launch Tech	0	0	20
Engineering For Complex Systems	0	0	5
Aero-Space Technology Mission Support	110	130	136
SAFETY AND MISSION ASSURANCE	**1**	**1**	**1**
Safety And Mission Assurance	1	1	1
ACADEMIC PROGRAMS	**2**	**2**	**2**
Academic Programs	2	2	2
Total full-time equivalents (FTEs)	**635**	**600**	**595**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATE

LANGLEY RESEARCH CENTER

ROLES AND MISSIONS

LEAD CENTER RESPONSIBILITIES:

Aerospace Technology

- Aviation Safety - The NASA Aviation Safety Program was created in 1997. The program's goal is to develop and demonstrate technologies that contribute to a reduction in the aviation fatal accident rate by a factor of 5 by year 2007 and by a factor of 10 by year 2022. This ambitious program is a partnership between NASA, the Federal Aviation Administration (FAA), the aviation industry and the Department of Defense (DoD). The safety program emphasizes not only accident reduction, but also a decrease in injuries when accidents do occur. The program includes research to reduce human-error-caused accidents and incidents, to predict and prevent mechanical and software malfunctions, and to eliminate accidents involving hazardous weather and controlled flight into terrain. The program also uses information technology to build a safer aviation system to support pilots and air traffic controllers. The FAA will help define requirements and actions to enact many of the safety standards. The DoD is expected to share in technology development as well as apply safety advances to military aircraft.

Earth Science - Performs an Agency-designated Atmospheric Science mission role in support of the Earth Science Enterprise in the NASA Strategic Plan. As Lead Center for Focused Atmospheric Science Missions, conducts a world-class peer reviewed and selected atmospheric science program in support of national goals in preserving the environment and in fundamental science. Specific discipline areas of expertise are Earth radiation research, particularly the role of clouds in the Earth's energy budget; middle and upper atmospheric research; and troposhperic research. Performs innovative scientific research to advance the knowledge of atmospheric radiative, chemical, and dynamic processes for understanding global change; develop innovative passive and active sensor systems concepts for atmospheric science measurements. Conducts a technology development program that develops advanced laser and LIDAR technologies for Earth science missions; advanced passive remote sensing technologies;. Develops advanced ultra-lightweight and adaptive materials, structural systems technologies, and analytical tools for significantly reducing the end-to-end cost and increasing the performance of earth observation space instruments and systems. Conducts an Application and Educational Outreach program that utilizes scientific data for non-scientific applications and in support of science and math education. Serves as a Primary Data Analysis and Archival Center (DAAC) for Earth Radiation and Atmospheric Chemistry for the Earth Observing System.

Center of Excellence for Structures & Materials - Provides Agency-wide leadership and strategically maintains or increases the Agency's preeminent position in structures and materials by serving as the NASA Center of Excellence for Structures and Materials.

Systems Analysis/Independent Program Evaluation and Assessment - Serves as the Agency lead Center for systems analysis and the conduct of independent evaluation, assessment, and cost estimation of Agency programs. Maintains, as a Center core competency, appropriate expertise and analysis tools to support the Agency's Strategic Enterprises in the definition and development of advanced systems concepts to achieve NASA's goals. Utilizes core systems analysis capabilities (supplemented with expertise from other centers as appropriate) to support the Office of the Administrator by conducting independent assessments of advanced concepts and proposed new systems to validate conceptual level designs prior to Agency commitment to major developmental funding. Provides Agency-wide independent cost estimates and analysis for programs and projects. Supports the Administrator's Program Management Council (PMC) in the organization, administration, and technical support of PMC review process

PERFORMING CENTER RESPONSIBILITIES:

Aerospace Technology

- Vehicle Systems - Langley Research Center (LaRC) conducts advanced research in fundamental airframe systems technologies including: aerodynamics; high-speed, highly maneuverable aircraft; hypersonic propulsion; guidance and controls; acoustics; and structures and materials. Develops a technology base for improving transport, fighter, general aviation, and commuter aircraft. Conducts an aeronautical research and technology program to study current and future technology requirements and to demonstrate technology applications. Conducts theoretical and experimental research in fluid and flight mechanics to determine aerodynamic flows and complex aircraft motions. Develop a new vehicle research thrust to explore advanced vehicle concepts and revolutionary new technologies to enable the development of advanced 21st Century Air Vehicles. LaRC conducts research to develop new technologies such as advanced aeroelastically tailored materials, new structural concepts, embedded sensors, intelligent systems, and microactuators. Employ advanced analysis methods to combine these new technologies to develop innovative new airframe systems with improved safety, reduced emissions and noise, and reduced cost per seat mile for commercial transport and general aviation aircraft.

- Airspace Systems - Employ advanced analysis methods to combine these new technologies to develop innovative new airframe systems with increased capacity. Conducts control and guidance research programs to advance technology in aircraft guidance and navigation, aircraft control systems, cockpit systems integration and interfacing techniques, and performance validation and verification methods. For the Small Aircraft Transportation Systems (SATS), the focus of this effort is the development of three airborne capabilities: (1) higher volume operations at non-towered, non-radar small airports, (2) lower landing minimums at minimally equipped landing facilities, and (3) flight systems for reduced pilot/system error.

- Space Launch Initiative - LaRC is the lead performing Center for the development and demonstration of technologies for advanced airframe design and integration methods to improve airframe reliability and reduce design cycle time; aerodynamics and aerothermodynamics assessment which yields higher fidelity information and supports reduced design cycle time; and robust, low cost, low maintenance structures, materials, tanks, Thermal Protection System (TPS) and integrated thermal structures.

- Space Transfer & Launch Technology (STLT) - Conducts aeronautics and space research and technology development for airframe systems to advance space transportation systems, including hypersonic aircraft and space access vehicles using airbreathing and rocket propulsion. Conducts research to develop airframe technologies and capabilities for next generation reusable launch vehicles and to develop aeroassist technologies and capabilities to enable safer and more affordable spacecraft. Specific technology discipline areas of expertise are aerodynamics, aerothermodynamics, structures, materials, hypersonic propulsion, guidance and controls, and systems analysis. Conducts long-range studies directed at defining the technology requirements for advanced transportation systems and missions. Develops technology options for realization of practical hypersonic and transatmospheric flight.

Space Sciences – Conducts studies and selected technology development for future planetary atmospheric flight vehicles including aeroshells, airplanes, gliders, etc, and continues to provide analysis of spacecraft aerodynamics, aerothermodynamics, and flight dynamics for spacecraft entering planetary atmospheres (including Earth) in support of both spacecraft design and flight operations. Conducts a technology development program for advanced ultra-lightweight and adaptive materials, structural systems technologies, and analytical tools for significantly reducing the end-to-end cost and increasing the performance of space science instruments and systems. Develops active and passive sensor technologies and concepts for application in planetary atmospheric studies. Selectively develops laser, LIDAR, and passive sensor technologies and perform research for planetary studies in areas which are related to our Earth Science role. Supports the solicitation and selection process of the Office of Space Science's (OSS) Discovery, Explorer, and Solar Terrestrial Probes Programs; conduct reviews of candidate and selected missions and independent assessments of on-going space science missions to help ensure that OSS criteria for high quality science return within cost and schedule constrains are met. Also is responsible for the design and development of atmospheric entry vehicle technologies for ongoing robotic exploration programs.

Human Exploration and Development of Space - Supports the Human Exploration and Development of Space through systems analyses of future human space exploration missions, assessments of the proper balance between human and robotic exploration, evaluations of shuttle safety and performance improvements, and development of tools and analytical methodologies in support of the space station.

Biological and Physical Research - Conducts space radiation exposure studies and develops/upgrades analysis tools in support of current and future human space efforts for a more accurate assessment of astronaut radiation exposures. Develops and tests new materials to minimize astronaut radiation exposure by improving body-shielding factors.

Center Management and Operations - Provides management, administrative and financial oversight of NASA programmatic elements under LaRC cognizance. Provides for the safe and effective operation and maintenance of supporting facilities, systems, and equipment. Serves as the Principal Center for the Agency in the following areas: integrated financial management (travel management), information technology business case review, Scientific and Technical Information Program, government travel charge card program, excess equipment screening, and the Academy of Program/Project Leadership. Also included in this area is the System Management office which provides support and independent evaluations of projects and programs. Also included in this area is the System Management office which provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
LANGLEY RESEARCH CENTER

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPEMENT OF SCIENCE	**34**	**43**	**15**
International Space Station	21	28	0
HEDS Mission Support	13	15	15
SPACE SCIENCE	**86**	**94**	**98**
Major Development Programs	1	1	1
Explorer Program	1	4	4
Mars Exploration Program	54	50	52
Discovery Program	6	4	4
Technology Program	5	14	15
Research Program	1	3	3
Space Science Mission Support	18	18	19
BIOLOGICAL & PHYSICAL RESEARCH	**0**	**0**	**28**
ISS Research Capability	0	0	28
EARTH SCIENCE	**299**	**328**	**328**
Earth Observing System Program	46	57	53
Earth Probes Program	31	60	61
Operating Missions	6	3	3
Research & Technology	170	144	146
Earth Science Mission Support	46	64	65
AERO-SPACE TECHNOLOGY	**1,930**	**1,868**	**1,864**
Aero-Space Focused Programs	535	474	0
Aero-Space Base	927	985	0
Commercial Technology Program	61	44	44
Space Base Program	63	0	0

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
LANGLEY RESEARCH CENER (continued)

	FY 2001	FY 2002	FY 2003
Aviation Safety	0	0	204
Vehicle Systems	0	0	827
Airspace Systems	0	0	72
2nd Generation RLV Focused	0	0	153
Space Transfer & Launch Tech	0	0	88
Computing Info & Communications Tech	0	0	19
Engineering For Complex Systems	0	0	5
Enabling Concepts & Technologies	0	0	82
Aero-Space Technology Mission Support	344	365	370
SAFETY AND MISSION ASSURANCE	**32**	**31**	**31**
Safety And Mission Assurance	32	31	31
ACADEMIC PROGRAMS	**0**	**1**	**1**
Academic Programs	0	1	1
Total full-time equivalents (FTEs)	**2,381**	**2,365**	**2,365**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

GLENN RESEARCH CENTER at LEWIS FIELD

ROLES AND MISSIONS

PERFORMING CENTER RESPONSIBILITIES

Vehicle Systems Program - Aerospace Propulsion and Power Project - The Aerospace Propulsion and Power Base R&T Project provides a foundation for the broad range of high-risk, high pay-off technologies needed for a steady influx of concepts available for use by the U.S. aerospace industry through the future years. It supports the Enterprise goals by providing a foundation to enable the following:

- The development of advanced technology concepts and methodologies for future application by industry;
- The advancement of high-risk technologies to a maturity level such that further research and development can be conducted by programs focused on selected national needs;
- A quick response to critical safety, security and other issues; and
- World-class aeropropulsion facilities and expert consultation for industry during their product development.
  The Aerospace Propulsion and Power Base R&T project spans subsonic, supersonic, hypersonic, general aviation, high performance aircraft, and access-to-space propulsion systems through research in combustion, turbomachinery, materials and structures, computational fluid dynamics, instrumentation and controls, aerospace power technology, interdisciplinary technologies, and aircraft icing. In addition, GRC provides enabling technologies for space initiatives and Advanced Space Transportation. The enabling technologies span the areas of power systems, on-board propulsion systems, air breathing propulsion, rocket components and integrated vehicle monitoring systems.

Vehicle Systems Program - Ultra-Efficient Engine Technology Project - Another Lead-Center project, Ultra-Efficient Engine Technology, is planned and designed to develop high-payoff, high-risk technologies to enable the next breakthroughs in propulsion systems to spawn a new generation of high performance, operationally efficient and economical, reliable and environmentally compatible U.S. aircraft. The breakthrough technologies are focused on propulsion component and high temperature engine materials development and demonstrations enabling future commercial and military propulsion systems which are greatly simplified, achieve higher performance, and have potential for much reduced environmental impact with a broad range of aircraft application.

Enabling Concepts and Technologies Program - Space Power and Electric Propulsion - Glenn is a world leader in research and development of ion propulsion and aerospace power systems. The mission of the Glenn Research Center Power and Electrical Propulsion effort is to advance the state of technology from the lowest technology level to the highest readiness level needed for NASA missions and commercialization. The transition to higher technology readiness levels (TRL) will continue to be

accomplished by a combination of in-house design, development, test and evaluation in cooperation with other NASA Centers, other government agencies, universities, small and large business, and industry. The Power activity includes technologies, such as advanced solar cells and arrays, energy storage systems (including batteries, fuel cells, and flywheels), thermal energy storage/conversion, and power management and distribution (PMAD). Solar and nuclear electric propulsion activities include electrostatic ion, Hall effect, and pulsed plasma thrusters.

Nuclear Power Program – The Glenn Research Center provides leadership and management of this Program, as well as makes significant technology advancements, in the areas of advanced nuclear power and propulsion capabilities to enable future complex interplanetary science missions for the Agency. Some of the specific technologies being developed include advanced radioisotope power conversion devices, Brayton energy conversion, power management and distribution (PMAD), advanced electrostatic ion and Hall effect propulsion systems, and advanced heat rejection technologies.

Microgravity Research - The Glenn Research Center (GRC) provides leadership and management of the fluid physics, combustion science, and the microgravity environment disciplines of NASA's Microgravity Science Program. Sponsors and conducts ground-based scientific studies that may lead to experiments in space. GRC has a substantial effort in the design, buildup, testing, integration, and telescience operations of hardware for experiments to be conducted aboard the Space Shuttle and the utilization of the Space Station for scientific missions.

International Space Station - GRC support to the space station program includes technical and management support in the areas of power and on-board propulsion components and system, engineering and analysis, technical expertise, and testing for components and systems. This includes use of facilities and testbeds and construction of flight hardware as required.

Mission Communications Services - GRC develops and demonstrates communications and networks technologies in relevant environments to enhance the performance of existing mission services or enable new services. The Center identifies and infuses new capabilities at currently used frequencies and at higher frequencies (Ka-band and above) into the next generation of spacecraft and communications satellites, to enable seamless interoperability between NASA assets and commercial space and ground networks. The Center also ensures timely and high quality availability of radio frequency spectrum to enable the realization of NASA goals.

Center Management and Operations - Provides administrative and financial services in support of Center Management and provides for the operation and maintenance of the institutional facilities, systems, and equipment. Also included in this area is the System Management office that provides support and independent evaluations of projects and programs. Also included in this area is the System Management office that provides support and independent evaluations of projects and programs.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
GLENN RESEARCH CENTER at LEWIS FIELD

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**321**	**217**	**176**
International Space Station	213	90	50
Space Operations (SOMO)	56	50	50
Space Flight Operations (Space Shuttle)	3	3	3
HEDS Mission Support	49	74	73
SPACE SCIENCE	**15**	**57**	**57**
Technology Program	12	45	45
Space Science Mission Support	3	12	12
BIOLOGICAL & PHYSICAL RESEARCH	**118**	**285**	**285**
Biological & Physical Research	93	104	104
ISS Research Capabilities	0	155	155
B&PR Mission Support	25	26	26
EARTH SCIENCE	**3**	**4**	**4**
Research & Technology	3	4	4
AERO-SPACE TECHNOLOGY	**1,475**	**1,347**	**1,389**
Aero-Space Focused Programs	361	307	0
Aero-Space Base	627	734	0
Commercial Technology Program	24	24	24
Space Base Program	178	0	0
Aviation Safety	0	0	91
Vehicle Systems	0	0	610
Airspace Systems	0	0	12
2nd Generation RLV Focused	0	0	30
Space Transfer & Launch Tech	0	0	83
Computing Info & Communications Tech	0	0	90
Enabling Concepts & Technologies	0	0	133
Investment – AST	9	9	9
Aero-Space Technology Mission Support	276	273	307
SAFETY AND MISSION ASSURANCE	**13**	**13**	**13**
Safety And Mission Assurance	13	13	13
Total full-time equivalents (FTEs)	**1,945**	**1,923**	**1,924**

RESEARCH AND PROGRAM MANAGEMENT

FISCAL YEAR 2003 ESTIMATES

NASA HEADQUARTERS

ROLES AND MISSIONS

MISSION - Plan and provide executive direction for the implementation of U. S. space exploration, space science, Earth science, aeronautics, and technology programs. This includes corporate policy development, program formulation, resource allocations, program performance assessment, long-term institutional investments, and external advocacy for all of NASA.

MAJOR CORPORATE ROLES - The broad framework for program formulation will be conducted through five Strategic Enterprises:

- Human Exploration and Development of Space
- Biological and Physical Research
- Earth Science
- Space Science
- Aerospace Technology

Consistent with the NASA strategic plan, the Strategic Enterprises develop program goals and objectives to meet the needs of external customers within the policy priorities of the Administration and Congress.

Corporate-level enabling processes and staff functions will provide crosscutting interfaces required to support the Strategic Enterprises in:

- Legislative Affairs
- Budget And Financial Management
- Human Resources
- Legal Affairs
- International Affairs
- Information Systems And Technology
- Safety And Mission Quality
- Security Management and Safeguards
- Public Affairs
- Equal Opportunity Programs
- Education
- Procurement
- Management Systems And Facilities
- Small Business
- Advisory Committees

These functions are distributed under Institutional Support across the different Enterprises.

DISTRIBUTION OF FULL-TIME EQUIVALENT (FTE) WORKYEARS BY PROGRAM
NASA HEADQUARTERS

	FY 2001	FY 2002	FY 2003
HUMAN EXPLORATION & DEVELOPMENT OF SPACE	**419**	**517**	**521**
HEDS Mission Support	419	517	521
SPACE SCIENCE	**123**	**135**	**148**
Space Science Mission Support	123	135	148
B&PR MISSION SUPPORT	**31**	**34**	**41**
B&PR Mission Support	31	34	41
EARTH SCIENCE	**89**	**101**	**112**
Earth Science Mission Support	89	101	112
AERO-SPACE TECHNOLOGY	**349**	**380**	**395**
Aero-Space Technology Mission Support	349	380	395
Total full-time equivalents (FTEs)	**1011**	**1167**	**1217**

The allocation of FTEs for Mission Support at Headquarters is determined by a formula based on the proportion of total civil service FTEs associated with each Enterprise across all NASA Centers. The numbers above do not reflect the number of direct FTEs at NASA Headquarters in each of the Enterprise offices since the function of HQ personnel is considered to be "corporate" in nature, supporting the entire Agency. The derivation for these FTEs is similarly used to distribute the cost of the NASA Headquarters civil servants to the Enterprises.

DETAIL OF PERMANENT POSITIONS

	FY 2001	FY 2002	FY 2003
Executive level II	1	1	1
Executive level III		1	1
Executive level IV	0	1	1
Subtotal	**1**	**3**	**3**
ES-6	36	39	44
ES-5	64	90	95
ES-4	124	146	151
ES-3	60	75	80
ES-2	40	75	65
ES-1	53	78	68
Subtotal	**377**	**503**	**503**
CA	1	1	1
SL/ST	67	67	67
GS-15	2,654	2,590	2,594
GS-14	3,900	3,813	3,809
GS-13	5,507	5,625	5,640
GS-12	1,854	1,821	1,836
GS-11	1,455	1,438	1,435
GS-10	187	217	217
GS-9	537	575	585
GS-8	282	298	298
GS-7	644	635	635
GS-6	360	422	422
GS-5	61	89	79
GS-4	23	32	32
GS-3	10	2	2
GS-2	3	0	0
Subtotal	**17,545**	**17,625**	**17,652**

DETAIL OF PERMANENT POSITIONS (continued)

	FY 2001	FY 2002	FY 2003
Special ungraded positions established by NASA Administrator (NEX)	16	48	48
Ungraded positions - Wage Grade	58	58	58
Total permanent positions	**17,997**	**18,237**	**18,264**
Unfilled positions, EOY	0	0	0
Total, permanent employment, EOY	**17,997**	**18,237**	**18,264**

PERSONNEL SUMMARY

	FY 2001	FY 2002	FY 2003
Average GS/GM grade	12.61	12.55	12.55
Average ES salary	$130,344	$135,036	$138,547
Average GS/GM salary	$71,992	$75,304	$77,262
Average salary of special ungraded positions established by NASA Administrator	$101,086	$105,736	$108,485
Average salary of ungraded positions	$46,555	$48,697	$49,963

CENTER LOCATIONS AND CAPITAL INVESTMENT

JOHNSON SPACE CENTER - The Lyndon B. Johnson Space Center is located 20 miles southeast of Houston, Texas. NASA owns 1,581 acres of land at the Houston site and uses another 60,552 at the White Sands Test Facility, Las Cruces, New Mexico. The total capital investment including land, buildings, structures and facilities, equipment, and other fixed assets was $2,548,687,000 as of September 30, 2001.

KENNEDY SPACE CENTER - The Kennedy Space Center is located 50 miles east of Orlando, Florida. NASA owns 82,943 acres and uses launch facilities at Cape Canaveral Air Station and Vandenberg Air Force Base. The total capital investment including land, buildings, structures and facilities, equipment, and other fixed assets was $1,770,633,000 as of September 30, 2001.

MARSHALL SPACE FLIGHT CENTER - The Marshall Space Flight Center is located within the U.S. Army's Redstone Arsenal at Huntsville, Alabama. MSFC also manages operation at the Michoud Assembly 15 miles east of New Orleans, Louisiana and the Slidell Computer Complex in Slidell, Louisiana. The total capital investment including land, buildings, structures and facilities, equipment, and other fixed assets was $3,365,674,000 as of September 30, 2001.

STENNIS SPACE CENTER - The Stennis Space Center is located approximately 50 miles northeast of New Orleans, Louisiana. NASA owns 20,663 acres and has easements covering an additional 118,284 acres. The total capital investment including land, buildings, structures and facilities, equipment, and other fixed assets was $484,856,000 as of September 30, 2001.

GODDARD SPACE FLIGHT CENTER - The Goddard Space Flight Center is located 15 miles northeast of Washington, D.C. at Greenbelt, Maryland. NASA owns 1,121 acres at this location and an additional 6,176 acres at the Wallops Flight Facility in Wallops Island, Virginia. The total capital investment including land, buildings, structures and facilities, equipment, and other fixed assets at both locations was $1,876,282,000 as of September 30, 2001.

AMES RESEARCH CENTER - The Ames Research Center is located south of San Francisco on Moffett Field, California. NASA owns 447.5 acres at the Moffett Field location. The total capital investment including land, buildings, structures and facilities, equipment, and other fixed assets at both locations was $1,043,942,000 as of September 30, 2001.

DRYDEN FLIGHT RESEARCH CENTER - The Dryden Flight Research Center is 65 air miles northeast of Los Angeles. Dryden is located at the north end of Edwards Air Force Base on 838 acres of land under a permit from the Air Force. The total capital investment at Dryden, including fixed assets in progress and contractor-held facilities at various locations, as of September 30, 2001 was $621,907,000.

LANGLEY RESEARCH CENTER - The Langley Research Center is adjacent to Langley Air Force Base which is located between Williamsburg and Norfolk at Hampton, Virginia. NASA owns 788 acres and has access to 3,276 acres. The total capital investment including land, buildings, structures and facilities, equipment, and other fixed assets was $938,505,000 as of September 30, 2001.

GLENN RESEARCH CENTER - The Lewis Research Center occupies two sites; the main site is in Cleveland, Ohio, adjacent to Cleveland-Hopkins Airport; the second site is the Plum Brook Station located south of Sandusky, Ohio, and 50 miles west of Cleveland. NASA owns 6,805 acres and leases an additional 14 acres at the Cleveland location. The total capital investment

including land, buildings, structures and facilities, equipment, and other fixed assets at both locations was $656,134,000 as September 30, 2001.

NASA HEADQUARTERS - NASA Headquarters is located at Two Independence Square, 300 E St. SW, Washington, D.C. and occupies other buildings in the District of Columbia, Maryland, and Virginia. These are leased facilities.